REMARKS

The specification has been amended at page 7, line 29, to correct a reference character.

Claim 11 has been amended to conform to its proper antecedent basis.

Figs. 21 and 28 have been amended to conform with the specification and with the informal drawings initially submitted with the application, and contain no new matter.

Responsive to the restriction requirement, Applicant has elected the first embodiment (Figs. 1, 2) of the first category, and the first embodiment (Figs. 12-19, 21-24) of the second category. In accordance with the Examiner's requirement, there is provided a listing of the claims readable on the elected species, namely, claims 1-28, 30, 31, 35-37, 47-59.

Reconsideration and removal of the restriction requirement is respectfully requested. It is respectfully submitted that the application may be most efficiently examined if all of the species identified by the Examiner were searched at one time, and such action is respectfully requested, MPEP 803.

For the Examiner's convenience, and to facilitate review, the elected claims are set forth below with supporting disclosure reference numerals from the specification inserted in parentheses.

1. A vehicle drivetrain (110) comprising an engine (122) having a vertical crankshaft (124), and a lower power take-off drive member comprising a vehicle propulsion transmission (126) below said engine (122).

2. The vehicle drivetrain according to claim 1 wherein said transmission transmits power along a horizontal plane.

3. The vehicle drivetrain according to claim 2 wherein said transmission (126) comprises at least one member (142) rotating in a horizontal plane below said engine.

4. The vehicle drivetrain according to claim 3 wherein said transmission (126) comprises a constant velocity clutch continuously variable transmission, CVT, comprising a first pulley (142) at the lower end of said vertical crankshaft (124) and driving a belt (146) driving a second pulley (144), each said pulley (142, 144) rotating in a horizontal plane.

5. A vehicle drivetrain (110) comprising:

an engine (122) having a PTO, power take-off (124), shaft;

a first transmission (126) below said engine (122) and driven by said PTO (124) shaft;

a second transmission (128) above said first transmission (126) and horizontally adjacent said engine (122), said second transmission (128) having an input (130) driven by said first transmission (126), and an output (132) providing vehicle propulsion.

6. The vehicle drivetrain according to claim 5 wherein said PTO shaft (124) extends vertically.

7. The vehicle drivetrain according to claim 5 wherein said output (132) of said second transmission (128) is a horizontal output shaft (132).

8. The vehicle drivetrain according to claim 5 wherein said input (130) of said second transmission (128) is a vertical input shaft (130).

9. The vehicle drivetrain according to claim 5 wherein said drivetrain (110) propels the vehicle in a forward direction, said PTO shaft (124) extends vertically, and said input (130) of said second transmission (128) is a vertical input shaft (130) aft of said PTO shaft (124).

10. The vehicle drivetrain according to claim 9 wherein said output (132) of said second transmission (128) is a horizontal shaft (132) aft of said vertical input shaft (130).

11. The vehicle drivetrain according to claim 5 wherein:

said PTO shaft (124) extends vertically;

said input (130) of said second transmission (128) is a vertical input shaft (130);

each of said engine (122) and said second transmission (128) are mounted to said first transmission (126) at an upper surface (134) thereof such that said PTO shaft (124) and said input shaft (130) extend vertically and in parallel above said first transmission (126).

12. The vehicle drivetrain according to claim 11 wherein said output (132) of said second transmission (128) is a horizontal output shaft (132) driven by said vertical input shaft (130).

13. The vehicle drivetrain according to claim 5 comprising a power transfer device (136) driven by said second transmission (128) to transfer power to propel the vehicle.

14. The vehicle drivetrain according to claim 13 wherein said power transfer device (136) comprises a pair of drive shafts (138, 140) driven in torque balancing counter-rotation, at least one of said drive shafts (138) providing vehicle propulsion.

15. The vehicle drivetrain according to claim 5 wherein:

said PTO shaft (124) extends vertically downwardly;

said second transmission (128) has a downwardly extending vertical input shaft (130);

said first transmission (126) is a constant velocity clutch continuously variable transmission, CVT, having a first pulley (142) driven by said PTO shaft (124), a second pulley (144) driving said input shaft (130) of said second transmission (128), and a belt (146) extending around said pulleys (142, 144) and driving said second pulley (144) from said first pulley (142), said pulleys (142, 144) rotating in a horizontal plane.

16. The vehicle drivetrain according to claim 15 comprising a CVT mounting case (148) housing said first and second pulleys (142, 144), and wherein said engine (122) and said second transmission (128) are each mounted to said CVT mounting case (148) at respective first and second mounting attachment locations (150, 152) precisely spaced and aligned to provide precise spacing of the centerlines of said PTO shaft (124) and said input shaft (130) of said second transmission (128) and precise alignment of such shafts (124, 130) in parallelism.

17. The vehicle drivetrain according to claim 16 comprising a power transfer device (136) driven by said output (132) of said second transmission (128) to transfer power to propel the vehicle.

18. The vehicle drivetrain according to claim 17 wherein said power transfer device (136) comprises a pair of (138, 140) drive shafts driven in torque balancing counter-rotation, at least one of said drive shafts (138) providing vehicle propulsion.

19. The vehicle drivetrain according to claim 18 wherein said power transfer device (136) comprises a power transfer rotary drive member (196) driven by said output (132) of said second transmission (128), and comprising a transfer case housing (214) said power transfer rotary drive member (196), wherein said transfer case (214) is mounted to said second transmission (128), the first of said drive shafts (138) is mounted to said transfer case (214) in journaled relation (216), and the second of said

drive shafts (140) is mounted to said CVT mounting case (214) in journaled relation (218).

20. The vehicle drivetrain according to claim 18 wherein:

said drivetrain (110) propels the vehicle forwardly;

said second transmission (128) is aft of said engine (122);

said output (132) of said second transmission (128) is a horizontally rearwardly extending output shaft (132);

the first of said drive shafts (138) extends rearwardly;

the second of said drive shafts (140) extends forwardly.

21. The vehicle drivetrain according to claim 17 comprising a transfer case (214) housing said power transfer device (136) and mounted to at least one of said second transmission (128) and said CVT mounting case (148).

22. The vehicle drivetrain according to claim 21 wherein said power transfer device (136) comprises a power transfer rotary drive member (196) driven by said output (132) of said second transmission (128), wherein said transfer case (214) is mounted to both said second transmission (128) and said CVT mounting case (148) for enhanced rigidity of the combination of said CVT mounting case (148) and components mounted thereto, namely said engine (122), said second transmission (128) and said transfer case (214) mounted thereto.

23. The vehicle drivetrain according to claim 16 wherein said CVT mounting case (148) is a sealed case enclosing and protecting said pulleys (142, 144) and said belt (146) against the elements, including water.

24. The vehicle drivetrain according to claim 23 wherein said CVT mounting case (148) has an air inlet port (234), an air outlet port (242), and an air circuit

duct (244) therein directing air from said air inlet port (234) around said pulleys (142, 144) and said belt (146) for cooling same, and then to said air outlet port (242).

25. The vehicle drivetrain according to claim 24 wherein said CVT mounting case (148) has a lower clamshell portion (230) having a pair of upstanding walls (246, 248) horizontally spaced from each other and defining a supply passage (250) therebetween extending from said air inlet port (234) and directing cooling air to cool said pulleys (142, 144) and said belt (146).

26. The vehicle drivetrain according to claim 25 wherein said pulleys (142, 144) are separated by a gap (252), and said supply passage (250) extends to an area (254) below said gap (252).

27. The vehicle drivetrain according to claim 26 wherein said lower clamshell portion (230) has a deflector ramp (256) in said supply passage (250) deflecting cooling air upwardly to said gap (252).

28. The vehicle drivetrain according to claim 26 comprising a transfer duct (258) extending from said lower clamshell portion (230) upwardly into said gap (252) between said pulleys (142, 144) and spaced laterally inwardly of said belt (146) and transferring cooling air from said supply passage (250).

30. The vehicle drivetrain according to claim 24 wherein said first pulley (142) includes a fan (266) circulating cooling air from said air inlet port (234) to said air outlet port (242) during rotation of said first pulley (142).

31. The vehicle drivetrain according to claim 25 wherein said lower clamshell portion (230) has an outer peripheral sidewall (268) defining a return passage (270) between said sidewall (268) and said upstanding walls (246), (248), and wherein said air outlet port (242) is through said outer peripheral sidewall (268).

35. The vehicle drivetrain according to claim 16 wherein said CVT mounting case (148) comprises a rigid member (228) mounted to said vehicle and bearing drivetrain stress.

36. The vehicle drivetrain according to claim 16 wherein said CVT mounting case (148) comprises a rigid member (228) mounted to said vehicle and providing both of said first and second mounting attachment locations (150, 152) in a single member.

37. The vehicle drivetrain according to claim 5 wherein:

said PTO shaft (124) extends vertically downwardly;

said second transmission (128) is a 90° gear transmission having a downwardly extending vertical input shaft (130), and a horizontal output shaft (132);

said first transmission (126) is a constant velocity clutch continuously variable transmission, CVT, having a first pulley (142) driven by said PTO shaft (124), a second pulley (144) driving said input shaft (130) of said second transmission (128), and a belt (146) extending around said pulleys (142, 144) and driving said second pulley (144) from said first pulley (142), said pulleys (142, 144) rotating in a horizontal plane.

47. The vehicle drivetrain according to claim 5 wherein the vehicle is an ATV, all terrain vehicle.

48. The vehicle drivetrain according to claim 5 wherein said engine (122) has a vertical crankshaft (124), and said PTO shaft (124) is said vertical crankshaft (124).

49. The vehicle drivetrain according to claim 48 wherein said crankshaft (124) is exactly vertical.

50. The vehicle drivetrain according to claim 5 wherein said output (132) of said second transmission (128) is a horizontal output shaft (132), said input (130) of said second transmission (128) is a vertical input shaft (130), and wherein said output shaft (132) is exactly horizontal, and said input shaft (130) is exactly vertical.

51. The vehicle drivetrain according to claim 15 wherein said plane is exactly horizontal.

52. A modular pre-assembled unit ready for drop-in mounting to a vehicle, and providing a drivetrain (110) for the vehicle, comprising in combination:

an engine (122) having a PTO, power take-off, shaft (124);

a first transmission (126) below said engine (122) and driven by said PTO shaft (124);

a second transmission (128) above said first transmission (126) and horizontally adjacent said engine (122) and having an input (130) driven by said first transmission (126);

a power transfer device (136) driven by said second transmission (128) to transfer power to propel the vehicle.

53. The modular pre-assembled unit according to claim 52 wherein:

said PTO shaft (124) extends downwardly and vertically;

said first transmission (126) is a constant velocity clutch continuously variable transmission, CVT, having a first pulley (142) driven by said PTO shaft (124), and a second pulley (144) driven by a belt (146) extending around said pulleys (142, 144), said pulleys rotating in a horizontal plane;

said second transmission (128) is a 90° gear transmission having a downwardly extending vertical input shaft (130) driven by said second pulley (144), and a horizontal output shaft (132);

said power transfer device (136) comprises a power transfer rotary drive member (196) driven by said output shaft (132) of said second transmission 128.

54. The modular pre-assembled unit according to claim 53 comprising a CVT mounting case (148) housing said first and second pulleys (142, 144), wherein said engine (122) and said second transmission (128) are each mounted to said CVT mounting case (148) at respective first and second mounting attachments (150, 152) precisely spaced and aligned to provide precise spacing of the centerlines of said PTO shaft (124) and said input shaft (130) of said second transmission (128) and precise alignment of such shafts (124, 130) in parallelism, and comprising a transfer case (214) housing said power transfer rotary drive member (196) and mounted to at least one of said second transmission (128) and said CVT mounting case (148).

55. A method for installing drivetrain components in a vehicle, comprising:

providing an engine (122) having a PTO, power take-off, shaft (124);

providing a first transmission (126) driven by said PTO shaft (124);

providing a second transmission (128) having an input (130) driven by said first transmission (126), and an output (132) providing vehicle propulsion;

mounting said engine (122) and said second transmission (128) to said first transmission (126) as a self-contained pre-assembled modular unit; and

drop-in mounting said modular unit to the vehicle.

56. The method according to claim 55 comprising providing a power transfer device (196) comprising a power transfer rotary drive member (196) driven by said output (130) of said second transmission (128), housing said power transfer rotary drive member (196) in a transfer case (214), and mounting said transfer case (214) to at least one of said first and said second transmissions (126, 128) prior to said drop-in mounting to the vehicle.

57. The method according to claim 55 comprising:

providing said PTO shaft (124) extending vertically downwardly;

providing said second transmission (128) as a 90° gear transmission having a downwardly extending vertical input shaft (130), and a horizontal output shaft (132);

providing said first transmission (126) as a constant velocity clutch continuously variable transmission, CVT, having a first pulley (142) driven by said PTO shaft (124), a second pulley (144) driving said input shaft (130) of said second transmission (128), and a belt (146) extending around said pulleys (142, 144) and driving said second pulley (144) from said first pulley (142), said pulleys (142, 144) rotating in a horizontal plane;

providing a CVT mounting case housing (148) said first and second pulleys (142, 144); and

mounting each of said engine (122) and said second transmission (128) to said CVT mounting case (148) at respective first and second mounting attachments (150, 152) precisely spaced and aligned to provide precise spacing of the centerlines of said PTO shaft (124) and said input shaft (130) of said second transmission (128) and precise alignment of said shafts (124, 130) in parallelism in said pre-assembled modular unit prior to said drop-in mounting to the vehicle.

58. A method for providing precise spacing and alignment of rotary shafts in a vehicle drivetrain, comprising:

providing an engine (122) having a PTO, power take-off, shaft (124);

providing a first transmission (126) comprising a constant velocity clutch continuously variable transmission, CVT, having a first pulley (142) driven by said PTO shaft (124), and a second pulley (144) driven by a belt (146) extending around said pulleys (142, 144);

providing a second transmission (128) having an input shaft (130) driven by said second pulley (144), and an output shaft (132) for providing vehicle propulsion;

providing a CVT mounting case housing (148) said first and second pulleys (142, 144); and

mounting each of said engine (122) and said second transmission (128) to said CVT mounting case (148) at respective first and second mounting attachments (150, 152) precisely spaced and aligned to provide precise spacing of the centerlines of said PTO shaft (124) and said input shaft (130) of said second transmission (128) and precise alignment of such shafts (124, 130) in parallelism.

59. The method according to claim 58 comprising:

providing said second transmission (128) as a 90° gear transmission having said input shaft (130), and having an output shaft (132) perpendicular to said input shaft (130);

providing a power transfer device (136) comprising a power transfer rotary drive member (196) driven by said output shaft (132) of said second transmission (128) and housed by a transfer case (214); and

mounting said transfer case (214) to at least one of said CVT mounting case (148) and said second transmission (128).

Respectfully submitted,

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